24. Light-vehicles Emissions Standards under EU Law in the Wake of the 'Dieselgate'

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1. INTRODUCTION

Given that cars have become icons for flexibility, individuality, and freedom,[1] the passenger car fleet in almost all of the EU Member States is growing constantly. In 2015 there were about 252 million light-duty vehicles and 31 million light-duty vehicles and 6 million trucks in the 28 Member States,[2] more than a quarter of the cars and trucks on the road worldwide. Given that the EU passenger car fleet grew by 4.5 per cent from 2011 to 2015, it is expected that these numbers will continue to grow. What is more, not only has the number of vehicles grown constantly over the past decades, but the distance travelled by each has increased as well. It comes thus as no surprise that the automotive industry is a major player in the EU economy. It provided 2.3 million direct jobs and 9.8 million indirect jobs in 2012. The turnover totals EUR 859 billion, which represents 6.4 per cent of the EU gross domestic product.

Cars, and the industries producing them, do however have significant impacts on the environment ranging from smog to climate change. Indeed, the road transport sector is one of Europe's main sources of air pollution. In 2017, it was deemed to be the largest contributor to total Nitrogen oxides (NOx) emissions and a significant contributor of black carbon (BC), Carbon monoxide (CO), Particulate matter ($PM_{2.5}$) and lead (Pb) emissions.[3] The annual limit values for pollutants such as Nitrogen dioxide (NO_2) and particulate matter continue to be widely exceeded across Europe. Air pollution is a major cause of premature death and disease and is the single largest environmental health risk in Europe. In particular, NOx emissions emitted from diesel engines, in particular light-duty vehicles, did not decrease significantly these last 20 years. Moreover, air pollution problems are compounded by the fact that diesel cars account in several Member States for nearly half of the cars after tax incentives encouraged a shift away from gasoline. The scandal involving the use of defeat devices by the Volkswagen group in order to blur the testing of vehicles in artificial conditions shed light on the flaws in the compliance with the EU rules on car emissions.[4]

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[1] N.A. Ashford and C.C. Caldart, *Environmental Law, Politics, and Economics* (Cambridge: MIT Press, 2008) 462.

[2] ACEA (European Automobile Manufacturers Association) *Report: Vehicles in use – Europe 2017*, 3–5, available at: https://www.acea.be/statistics/article/vehicles-in-use-europe-2017 (accessed 27 January 2019).

[3] EEA, *Air Quality in Europe – 2018 Report* (Copenhagen, 2018) 23.

[4] Relying on sophisticated technology, VW installed a software, also-called a defeat device, that switches off or turns down the car's emissions filtering system in certain diesel light vehicles. As a result, emissions from typical driving conditions were deliberately left much higher than promised

In the wake of the diesel scandal,[5] the EU institutions adopted different legislative and regulatory acts in order to overcome the regulatory and administrative flaws and to restore consumer confidence.

In order to understand this technically complex topic, lawyers have to juggle with a flurry of legislative directives as well as legislative and non-legislative regulations that are to a great extent entangled. To sum up, the EU has endorsed a three-pronged regulatory approach.

Firstly, the framework for the approval of motor vehicles and their trailers has been laid down by Directive 2007/46/EC that will be replaced in 2020 by Regulation (EU) 2018/858 (hereafter 'EU Type-Approval Regulation').[6]

Secondly, Regulation 715/2007 is one of the separate regulatory acts under the type-approval procedure laid down by Directive 2007/46/EC.[7] This regulation requires new light-duty vehicles to comply with certain emission limits.

Thirdly, the specific technical specifications associated with the fundamental provisions necessary to implement Regulation 715/2007 have been fleshed out in EC Regulation 692/2008.[8] In the course of 2016, Regulation 692/2008 has been amended by EC Regulations 2016/427 and 2016/646.[9] These amending regulations were adopted under the former comitology rules (regulatory procedure with scrutiny or RPS).[10]

All these acts have been adopted pursuant to Article 114 TFEU, as the genuine legal base for the harmonisation of the rules relating to products impairing the environment.[11] In particular, these acts aim at facilitating the free movement of motor vehicles and

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or tested. This was done with the aim of optimising apparent emission performance during the emissions test cycle. The use of a defeat device is expressly forbidden in both US and EU law. See D. Misonne, 'EU Dieselgate: Unveiling the Weirdness of the EU's Attitude to Compliance on Environmental Matters' (2019) *ELNI Rev.* 1, 52–9.

[5] L. Krämer, 'The VW Scandal-Air Pollution and Administrative Inertia' (2016), *ELNI Rev.* 2, 64–74.

[6] Directive 2007/46/EC of the European Parliament and of the Council of 5 September 2007 establishing a framework for the approval of motor vehicles and their trailers, and of systems, components and separate technical units intended for such vehicles (Framework Directive) (OJ L 263, 9 October 2007, p. 1). This directive will be repealed on September 1st 2020 by Regulation (EU) 2018/858 of the European Parliament and of the Council of 30 May 2018 on the approval and market surveillance of motor vehicles and their trailers, and of systems, components and separate technical units intended for such vehicles (OJ L 151, 14 June 2018, p. 1–218).

[7] Regulation (EC) No 715/2007 of the European Parliament and of the Council of 20 June 2007 on type approval of motor vehicles with respect to emissions from light passenger and commercial vehicles (Euro 5 and Euro 6) and on access to vehicle repair and maintenance information (OJ L 171, 29 June 2007, p. 1).

[8] Commission Regulation (EC) No 692/2008 of 18 July 2008 implementing and amending Regulation (EC) No 715/2007 of the European Parliament and of the Council on type-approval of motor vehicles with respect to emissions from light passenger and commercial vehicles (Euro 5 and Euro 6) and on access to vehicle repair and maintenance information (OJ L 199, 28 July 2008, p. 1).

[9] Commission Regulation (EU) 2016/427 of 10 March 2016 (OJ L 82, 31 March 2016, p. 1–98); Commission Regulation (EU) 2016/646 of 20 April 2016 (OJ L 109, 26.4.2016, p. 1–22).

[10] See Article 5bis of the 'comitology' Council Decision 1999/468/EC.

[11] N. de Sadeleer, *EU Environmental Law and the Internal Market* (Oxford, OUP, 2014) 157–61, 218.

trailers in the internal market by laying down harmonised requirements designed to achieve common environmental and safety objectives.

It is the aim of this chapter to explore several regulatory issues that arose with respect to the control of pollution emissions from light cars powered by gasoline and diesel.[12] This chapter is structured as follows. Section 2 will provide an analysis of the current emission standards and the improvements flowing from recent European Commission (EC) regulations aiming at improving the controls of the NOx emissions. CO_2 emissions are briefly discussed in this section. Just as important as the emission standards are the tests needed to ensure the proper compliance to these standards. Two separate, albeit related, issues must be distinguished. The first issue concerns CE certificate procedure (section 3). Closely related to this is the issue of whether the tests are rigorous enough (section 4). Section 5 discusses the penalties set out by EU law and applied haphazardly by 28 Member States. Section 6 concludes.

2. LIGHT-VEHICLES EMISSION LIMIT VALUES

2.1 From Euro 1 to Euro 6 Standards

EU harmonisation measures regarding car emissions are based on thresholds which may not be exceeded. These emission limit values are limiting the direct or indirect release of pollutants from cars emitted into the air. Light-duty vehicles had originally been regulated by Directive 70/220/EEC. The emissions standards were laid down by Directive 98/69/EC, which was one of the directives amending Directive 70/220/EEC. That directive was replaced by Regulation 75/2007. A whole series of amendments have been issued to stepwise tighten the limit values provided for under that regulation.

The Euro standards are formulated using a split-level approach:

- the key aspects are encapsulated in a legal act (Directive 70/220 and latterly on Regulation 715/2007) that has to be adopted by the Council and the European Parliament in accordance with the ordinary legislative procedure,
- the technical aspects which are regulated by means of implementing measures to be adopted in accordance with Article 291 TFEU by the EC flanked by a regulatory committee.

The type-approval emission requirements for motor vehicles pollutants (CO, NOx) have been gradually and significantly tightened through the introduction and subsequent revision of a flurry of Euro standards. The introduction of the Euro 1 standard in 1992 required the switch to unleaded petrol and the fitting of catalytic converters to petrol cars to reduce carbon monoxide (CO) emissions. The Euro 2 standard further reduced the limit

[12] See N. de Sadeleer, 'Harmonizing Car Emissions, Air Quality, and Fuel Quality Standards in the Wake of the VW Scandal: How to Square the Circle?' (2016) *EJRR* (1), 1–14; Ibid., 'Reinforcing EU Testing Methods of Air Emissions and the Approval Processes of Vehicle Compliance in the Wake of the VW Scandal' (2016) *ERA Forum*, 1–20.

for CO emissions and also reduced the combined limit for unburned hydrocarbons and oxides of nitrogen for both petrol and diesel vehicles. Since the Euro 2 stage, EU regulations introduced different emission limits for diesel and petrol vehicles. Euro 3 also added a separate NOx limit for diesel engines and introduced separate HC and NOx limits for petrol engines. With respect to light vehicles, Euro 4 lowered NOx emissions from 0,50 to 0.25 g/km and PM10 emissions from 0.05 to 0.0025 g/km.

In 2007, Directive 70/220/EEC was repealed and replaced by Regulation 715/2007 which harmonizes the technical emission standards for motor vehicles.[13] Tighter emission limits, known as Euro 5 and Euro 6, of atmospheric pollutants such as particulates and NOx for vehicles were established. As discussed below, manufacturers are called on to prove that all new vehicles sold, registered or put into service comply with these new emission standards.

Euro 5 further tightened the limits on particulate emissions from diesel engines from 25mg/km to 5mg/km. In addition, all diesel cars needed particulate filters to comply with the new requirements.

Given that the share of diesel vehicles in the overall sales of light-duty vehicles was increasing, the EU institutions went a step further in adopting Euro 6 standards that require the reduction of NOx diesel cars emissions from 180mg/km to 80mg/km. Euro 6 thresholds apply to new vehicle registrations from 2015. Given the speed with which the different thresholds were reduced, several carmakers faced difficulties to adjust their new models. By way of illustration, in 2012, less than 1 per cent of new vehicles already complied with the Euro 6 standard, while 91 per cent of all cars sold complied with the Euro 5 standard.[14]

The Euro 5 and Euro 6 ELVs are summarised in Tables 24.1 and 24.2 below.[15]

Table 24.1 European emission standards for gasoline passenger cars, g/km

	Date	CO	NOx	PM
Euro 5	September 2011	0.50	0.180	0.005
Euro 6	September 2014	0.50	0.80	0.005

Table 24.2 European emission standards for diesel passenger cars, g/km

	Date	CO	NOx	PM
Euro 5	September 2011	1.0	0.180	0.005
Euro 6	September 2014	1.0	0.80	0.005

[13] The specific technical provisions necessary to implement that Regulation were adopted by Commission Regulation (EC) No 692/2008.

[14] ICTT (The International Council on Clear Transportation) *European Vehicle Market Statistics 2013*, p. 6, available at: https://www.theicct.org/sites/default/files/publications/EU_vehiclemarket_pocketbook_2013_Web.pdf (accessed 27 January 2019).

[15] All tables in this chapter have been developed by the author.

Table 24.3 NOx emissions limits for diesel vehicles, mg/km

Euro standards	NOx emissions thresholds	Entry into force
Euro 3	500 mg/km	January 2000
Euro 4	250 mg/km	January 2005
Euro 5	180 mg/km	September 2009
Euro 6	80 mg/km	September 2014

Table 24.4 Air Quality Standards set forth under Directive 2008/50/EC

Pollutant	Averaging period	Limit value
PM10	1 day	50 µg/m3 (Microgram(s) per cubic metre) Not to be exceeded on more than 18 hours per year
	Calendar year	40 µg/m3
PM2.5	Calendar year	25 µg/m3
NO2	1 hour	200 µg/m3 Not to be exceeded on more than 18 hours per year
	Calendar year	40 µg/m3
CO	Maximum daily 8-hour	10 mg/m3
Pb	Calendar year	0.5 µg/m3

All in all, NOx emissions limits for diesel vehicles have been tightened as illustrated by Table 24.3.

The enactment of the Euro standards entails obvious advantages.[16] Firstly, the binding thresholds set a dividing line between what is lawful and what is unlawful. Secondly, the harmonisation of emission standards on EU level is particularly valued by the car industry, since they limit the distortions in competition resulting from decisions taken on a case-by-case basis by 28 national agencies, which creates uncertainty.

2.2 Emission Standards and Air Quality Standards

Emission standards do offer effective environmental protection provided that they are set and applied in order to avoid that air quality standards of Directive 2008/50/EC on ambient air quality are exceeded. This directive sets out limit values and target values for several pollutants released by different sources among which transport: SO2, PM10 and PM2.5, benzene, CO, Ld, NO_2 and NOx. In addition it distinguishes alert and limit values (for human beings) from critical levels (for ecosystems, plants, and trees). The standards that are related to pollutants emitted by cars are summarised in Table 24.4.

However, the interconnection between emission standards and air quality standards is far from obvious. The Directive 2008/50/EC thresholds are regularly exceeded in several

[16] N. de Sadeleer, (2014) o.c. 211–12.

Member States. The more stringent Euro 5 standards have been falling short in addressing major ambient air pollution in cities such as London, Paris, Brussels.

Several factors explain why a clean air policy in major cities was doomed to failure. While vehicles in general have delivered substantial emission reductions across the range of regulated pollutants, this was not the case for NOx emissions from diesel engines, in particular light-duty vehicles.[17] In addition, EU emission standards do not influence the manner in which cars are driven, which significantly impacts upon the air quality.[18] Moreover, the reductions in air emissions per car have constantly been eaten up by traffic increases. Furthermore, air pollution in cities is caused by different sources and not only by traffic. It follows that the regulation of the emission performance of individual cars does not necessarily lead to the necessary total emission reduction.

As a result, all EU citizens are still exposed to levels of air pollution the WHO considers harmful to health.[19] In particular, there are 400,000 premature deaths annually, ten times the number killed in road accidents. The health problems are particularly acute in urban areas and in densely populated regions.[20] These infringements are giving rise to a flurry of challenges. On the one hand, the EC has initiated infringement proceedings in accordance with Article 258 TFEU against 18 Member States for breaching the limits on PM10 and NO2. On the other hand, several NGOs have been initiating proceedings against national authorities on the grounds that they do not comply with the Directive 2008/50/EC on air quality standards.[21] Lastly, a number of cities have commenced banning vehicles not complying with Euro 5 standards from their centre.

2.3 CO_2 Emission Standards

Cars are responsible for around 12 per cent of total EU emissions of carbon dioxide (CO_2), which is not a pollutant but the main greenhouse gas. In 1999 and 2000, the EC endorsed three agreements concluded by the business federations regrouping carmakers which undertook to apply measures reducing CO_2 emissions – below the threshold of 140 g/km.[22] Given that this approach has not borne fruit, the EU lawmaker adopted a decade later Regulation 443/2009 setting emission performance standards for new passenger cars.[23] This regulation offers greater flexibility to the car manufacturers than the

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[17] Preamble, para. 4 of Commission Regulation amending Regulation (EC) No 692/2008 as regards emissions from light passenger and commercial vehicles (Euro 6). According to Commission data, currently produced Euro 6 diesel cars exceed the NOx threshold 4–5 times (400%) on average in real driving conditions compared to laboratory testing. See http://www.europarl.europa.eu/meetdocs/2014_2019/documents/imco/dv/com-ac_drc(2015)d040155-01_/com-ac_drc(2015)d040155-01_en.pdf (accessed 27 January 2019).

[18] S. Bell, D. McGillivray and O. Pedersen, *Environmental Law,* 8th ed. (Oxford, OUP, 2013), 245.

[19] EEA, *Air quality in Europe —2013 Report.*

[20] EEA, *Air quality in Europe — 2015 report,* 5/2015, 8.

[21] Case C-404/13 *ClientEarth* [2014] C:2014:2382.

[22] ACEA – European Automobile Manufacturers' Association; JAMA – Japanese Automobile Manufacturers' Association, and KAMA – Korean Automobile Manufacturers' Association. See L. Krämer, *EU Environmental Law*, 8th edn (London, Sweet & Maxwell, 2016), 313.

[23] Regulation (EC) No 443/2009 of the European Parliament and of the Council of 23 April 2009 setting emission performance standards for new passenger cars (OJ L 140, 2009, p.1–15).

compulsory thresholds for the pollutants emitted by each car.[24] Each manufacturer has to comply with a specific target. Accordingly, a threshold of 130g/km applies between 2012 and 2015. By 2021, the fleet average to be achieved by all new cars is 95g/km of CO_2. If the average CO_2 emissions of a manufacturer's fleet exceed its limit value in any year from 2012, the manufacturer has to pay an excess emissions premium for each car registered. On 15 April 2019, the Council formally adopted the agreement reached by the European Parliament to strengthen this approach: new cars will emit on average 15 per cent lower in 2025 and 37.5 per cent less CO_2 compared to 2021 levels. The CO_2 reduction effort will be distributed among manufacturers on the basis of the average mass of their vehicle fleet. Moreover, the new regulation provides for a mechanism encouraging the sale of more zero- and low-emission vehicles (fully electric cars). If a manufacturer meets certain benchmarks, it will be rewarded with less stringent CO_2 targets.[25]

3. TYPE-APPROVAL PROCEDURE

3.1 The Flaws of the Type-approval Procedure

Type-approval requirements for motor vehicles and their trailers are currently set out in Directive 2007/46/EC, being a framework directive providing the Member States with a common legal framework for the approval of motor vehicles.[26]

Under the type-approval regime, the manufacturer or the importer may make an application for approval in any Member State. Before being placed on the market, the vehicle type is tested by a national technical service. The national approval authority then delivers the approval ('CE certificate') on the basis of these tests. In virtue of the principle of mutual recognition the CE certificate is valid throughout the EU. It suffices thus that the vehicle is approved in one Member States for all vehicles of its type to be registered with no further checks throughout the EU on the basis of their certificate of conformity.

However, as hinted as above, from an environmental perspective, the VW scandal highlighted flaws of the EU scheme. Several factors come into play.

Firstly, the type-approval framework is based on the principle of mutual recognition, according to which all new vehicles produced in conformity with a type of vehicle approved by one Member State benefit from the right of being freely marketed and registered in the other Member States. Given that the type-approval granted is valid all over the EU, the competent type-approval authorities (TAAs) have been competing with each

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[24] D. Zannoni, 'Balancing Market Needs and Environental Protection: Vehicle Approval in the EU' (2018) *MJ* 25(4), 507.

[25] Regulation of the EP and of the Council setting CO2 emission performance standards for new passenger cars and for new light commercial vehicles.

[26] Directive 2007/46/EC of the European Parliament and of the Council of 5 September 2007 establishing a framework for the approval of motor vehicles and their trailers, and of systems, components and separate technical units intended for such vehicles (Framework Directive), OJ L 263, p. 1.

other.[27] To make matters worse, the system of information among TAAs did not preclude a car manufacturer for asking from requesting a type approval from a Member State after its request had been rejected in another one. Moreover, the risk of competition between the TAAs was exacerbated by the fact that the current rules for type approval were not clear enough and were not homogenously applied in the Member States.[28] It comes thus as no surprise that carmakers were avoiding the stricter Member States.

Secondly, the TAAs did not investigate whether car emissions exceeded the EU thresholds when car models were driven on the road instead of in a laboratory. They argued that EU legislation had not spelled out how to carry out the surveillance of air pollutants emitted by cars. Checking for defeat devices has never been a high priority among the TAAs. To make matters worse, they did not have access to the software used by some manufacturers.[29]

Thirdly, the independence of the TAAs has been called into question because they receive substantial income from car manufacturers for issuing the certificates, called type approvals.[30]

Needless to say, these flaws have seriously been undermining the decentralised car-approval scheme flowing from Directive 2007/46/EC. Against this background, the European Parliament (EP) decided on 17 December 2015 to set up a Committee on Inquiry (EMIS Committee) to investigate alleged contraventions and maladministration in relation to emission measurements in the automotive sector. Acknowledging an obvious 'lack of control after type approval', this Committee requested for 'a drastic strengthening of market surveillance'.[31] That strengthening took place in 2018 with the adoption of Regulation 2018/858 discussed below.

3.2 Regulation 2018/858 on the Approval and Market Surveillance of Motor Vehicles and their Trailers

As stressed above, the VW scandal highlighted weaknesses in the implementation of type-approval rules for motor vehicles in the EU, in particular as regards the testing of the compliance with standards on emissions of NOx. The EU lawmaker adopted on 30 May 2018 Regulation 2018/858 on the approval and market surveillance of motor vehicles and their trailers, and of systems, components and separate technical units intended for such vehicles (the 'EU Type-Approval Regulation').[32] This Regulation will apply as from 1 September 2020. It will repeal Directive 2007/46/EC.

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[27] EP Committee of Inquiry into emission measurements in the automotive sector (EMIS) consideration on the approval and market surveillance of mother vehicles and their trailers, 21 October 2016.

[28] Ibid.

[29] L. Krämer, 'Dieselgate and the Protection of the Environment by Public Authorities' in E. Maitre-Ekern, C. Dalhammer and H.C. Bugge (eds) *Preventing Environmental Damage from Products An Analysis of the Policy and Regulatory Framework in Europe*, (Cambridge, CUP, 2018) 160–70.

[30] As explained by the European Commission: http://europa.eu/rapid/press-release_MEMO-18–3652_en.htm (accessed 27 January 2019).

[31] EMIS consideration on the approval and market surveillance of mother vehicles and their trailers, 21 October 2016.

[32] *OJ* L 151, 14 June 2018, p. 1.

We shall demonstrate that this reform does not amount to a breakthrough, in particular on the account that the new regulation is still permeated by this emphasis on decentralisation likely to exacerbate the competition between the TAAs.

3.2.1 Type-approval certificate

All 'new vehicles, systems, components and separate technical units' intended for such type of vehicle are subject to a type-approval procedure[33] that focuses on pre-market compliance checks of the prototype vehicles. Accordingly, the vehicles or their devices have to undergo a number of tests to verify whether they comply with a set of technical requirements [34] regarding the environmental (e.g. emissions of pollutants) and safety performance (e.g. lighting, crashworthiness, breaking, pedestrian protection, braking performance, stability control) in order to ensure the protection of vehicle's occupants and other road users.

If all these requirements are fulfilled, the national authority delivers a EU vehicle type-approval certificate to the manufacturer authorising the placing on the market of the vehicle type in the EU.[35] Conversely if the prototype or individual parts or components (such as seats or steering wheel airbags) fail to pass the type-approval test, they cannot be placed on the market.

The EU type-approval system obliges the vehicle manufacturers to produce their vehicles, systems, components and separate technical units in conformity with the approved type.[36] The manufacturer has to certify this by issuing a certificate of conformity that is like the car's birth certificate. This certificate indicates that the vehicle corresponds to an approved type.[37] Of importance is that the time validity of a type-approval certificate expires after seven or years years,[38] with the possibility of being renewed if the TAA certifies that it still complies with the applicable rules.

Given that the conformity of production is one of the 'cornerstones' of the EU type-approval system, the arrangements set up by the manufacturer to ensure such conformity should be approved by the competent authority, and should be subject to regular verification by means of independent periodic audits to be carried out by public authorities.[39]

The functioning of the type-approval activities has to be 'periodically reviewed' by the national authorities, at least every four years.[40] In addition, with the aim of ensuring 'the uniform application' of the regulation, the EC has to carry out regular assessments of the procedures put in place by approval authorities.[41]

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33 Article 1(1).
34 Article 5(1). These requirements are listed in Annex II of the regulation.
35 Article 6(5); Article 7(1).
36 Preamble, 40.
37 In 2017 almost 17.5 million new motor vehicles were registered in the EU.
38 Article 35.
39 Preamble, 42.
40 Article 6(8).
41 Article 10(1)–(2).

3.2.2 Technical services

The 28 TAAs designate their technical services that are acting as 'testing laboratories'.[42] These services are endowed with the right to carry out unannounced factory inspections and to conduct physical or laboratory tests on products covered by the regulation.[43] Given that these services test and inspect new car models, they have to be approved by the TAA.[44] In addition, they have to be regularly and independently audited, on the basis of stringent performance criteria.[45] In order to avoid the risk of collusion with private interests, the EC will have the power to suspend, restrict or withdraw the designation of technical services that are underperforming and are too lax in applying the rules. However, one weakness of the procedure has not been addressed. The technical services that perform the official type-approval testing are still paid directly by car manufacturers.[46] This could lead to conflicts of interest and compromise the independence of testing.

3.2.3 Market surveillance and corrective measures

The diesel scandal has shed light on the weakness of the so-called 'market surveillance' checks by TAA. Against this background, the 2018 'EU Type-Approval Regulation' lays down stricter requirements for 'the market surveillance of vehicles, systems, components and separate technical units that are subject to approval'.[47] The market surveillance aims at verifying whether the vehicle or its devices comply with the requirements set out in secondary law (e.g. the Euro 5 and 6 standards) and 'do not endanger health, safety, the environment or any other aspect of public interest protection'.[48] These checks must be performed by means of documentary checks, laboratory tests or on-road tests.[49] In order to avoid potential conflicts of interest, approval authorities and market surveillance authorities should not be linked when carrying out their tasks.[50] Manufacturers are subject to greater scrutiny given that the authorities have to test a minimum number of cars: a verification test must be carried on at least one car for every 40,000 new motor vehicles that have been registered.[51] What is more, the national authorities have to review regularly the functioning of their market surveillance activities and make the results publicly available.

What deserves attention is that the market surveillance is no longer the exclusive province of the TAAs. In effect, the EC is obliged to carry out 'tests and inspections' independent of those carried out by Member States under their national market surveillance obligations.[52]

Furthermore, a fundamental overhaul has been undertaken with respect to corrective

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42 Article 3(34); Article 30(1).
43 Article 6(7).
44 Article 67(1).
45 Article 67(2).
46 Preamble, 17. The Commission had proposed modifying the remuneration system to avoid financial links between technical services and manufacturers.
47 Article 1(2).
48 Article 3(38).
49 Article 8(1).
50 Preamble, 25; Article 6(1), 3rd para.
51 Article 8(2).
52 Preamble, 35; Article 9(1). An Enforcement Forum will coordinate the network of national authorities responsible for type-approval and market surveillance.

measures. National authorities as well as the EC may order corrective measures and order recalls at no cost to the consumers.[53]

3.2.4 Critical remarks

The 2018 'EU Type-Approval Regulation' aims, among others, to introduce market surveillance provisions to complement the type-approval requirements. It also improves the enforcement of the type-approval framework by harmonising the type-approval and conformity procedures applied by the different authorities and technical services. All in all, given that Regulation 2018/858 guarantees the independence of the national authorities vis-à-vis manufacturers and prevent a conflict of interest,[54] the oversight of the harmonised type approval should be expected to have improved. Nevertheless, one could regret that the creation of an independent EU agency that would have been in charge of supervising the framework has been discarded. Furthermore, the common playing field envisioned at EU level could still be hindered by centrifugal forces. In effect, the decentralisation of the type-approval scheme is likely to increase the competition between the TAAs and between technical services. In our view, it would have been more efficient and cheaper to set up one single authority in charge of supervising the system instead of 28 TAAs.

4. EMISSION TEST CYCLE

Just as important as the emission standards are the tests needed to ensure the proper compliance to these standards. These are laid out in standardised emission test cycle aiming at measuring emissions performance against the regulatory thresholds applicable to the tested vehicle.

4.1 Testing of Air Emissions Limits

4.1.1 The flaws of the testing

With respect to light vehicles, since the Euro 3 regulation in 2000, performance has been measured in applying the New European Driving Cycle (NEDC).[55]

In spite of the fact that air emissions limits for cars have been progressively tightened, the obsolete laboratory tests have meant that they failed to deliver. In effect, laboratory tests did not accurately reflect the amount of air pollution emitted during real driving conditions. Several devices were likely to be applied with a view to reducing the emissions (electrical instruments being switched off, battery fully charged, over-inflated tyres, folding of side mirrors, etc.). Regarding diesel cars, the NOx output has been significantly greater than the lab output. A consequence of the disparity between the Euro 5 and 6 standards and the NEDC has been persistent air quality problems, in particular in urban areas. [56]

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[53] Preamble, 46; Article 52.
[54] Preamble, 4.
[55] Emissions standards for heavy-duty vehicles have been subject to different test requirements.
[56] ICTT, *European Vehicle Market Statistics 2013*, p. 11.

Table 24.5 Relationship between Commission Regulation 2016/427 of 10 March 2016 and Commission Regulation 2016/646 of 20 April 2016

Acts	Object	Nature
EP and Council Regulation 715/2007	General obligations on type-approval of motor vehicles with respect to emissions from light passenger and commercial vehicles (Euro 5 and Euro 6)	Legislative
Commission Regulation 692/2008	Specific technical provisions necessary to implement Regulation No 715/2007	Non-legislative act
Commission Regulations 2016/427 and 2016/646	Amendments to Commission Regulation 692/2008 introducing RED tests and conformity factors	Non-legislative act

The VW scandal highlighted the need to shift the tests out of the lab and onto the road. Given that the EC's review found that the NEDC tests were no longer adequate or no longer reflected real world emissions,[57] this institution was called on in virtue of Article 14(3) of Regulation 715/2007 to adapt them 'so as to adequately reflect the emissions generated by real driving on the road'. The necessary measures, which are designed to amend non-essential elements of this Regulation, by supplementing it, had to be adopted in accordance with the regulatory procedure with scrutiny pursuant to Decision 1999/468/EC.

Account must be taken of two Commission Regulations (2016/427 of 10 March 2016 and 2016/646 of 20 April 2016) that are inserting new provisions in Regulation 692/2008 that is fleshing out the obligations laid down in Regulation 715/2007 as regards emissions from light passenger and commercial vehicles (Euro 6). Table 24.5 above highlights the relationship between these different acts.

4.1.2 EC Regulation 2016/427: shifting the tests out of the lab and onto the road

In the wake of the VW scandal, on October 27, 2015 the European Parliament adopted a resolution calling on the EC and Member States to introduce an ambitious on-the-road test in 2017 to finally meet the current Euro 6 limit for diesel cars of 80mg of NOx per km.

EC Regulation 2016/427 introduces in Regulation 692/2008 testing in real-world conditions called Real Driving Emissions (RDE) in addition to laboratory tests.[58] The RDE procedure should enable the authorities to verify whether the emission levels of

[57] The Commission has performed a detailed analysis of the procedures, tests and requirements for type approval that are set out in Regulation (EC) No 692/2008 on the basis of own research and external information and found that emissions generated by real driving on the road of Euro 5/6 vehicles substantially exceed the emissions measured on the regulatory New European Driving Cycle (NEDC), in particular with respect to NOx emissions of diesel vehicles. See Recital 3, Preamble of the Commission Regulation amending Regulation (EC) No 692/2008 as regards emissions from light passenger and commercial vehicles (Euro 6).

[58] Commission Regulation (EU) 2016/427 of 10 March 2016 amending Regulation (EC) No 692/2008 as regards emissions from light passenger and commercial vehicles (Euro 6), OJ L 82, 31 March 2016, p. 1.

Table 24.6 Real Driving NOx Emissions mg/km

Timetable	Vehicles	Conformity factor	Maximum overshoot
September 2017	New models	Maximum 2.1 (110%)	168 mg/km NOx
September 2019	New vehicles	Maximum 2.1 (110%)	168 mg/km NOx
January 2020	All new vehicles	Maximum 1.5 (50%)	120 mg/km NOx

NOx, and at a later stage particle numbers (PN), measured during the laboratory test are confirmed in real driving conditions. Practically speaking, cars have to be tested on roads according to random acceleration and deceleration patterns. The pollutant emissions will be measured by portable emission measuring systems (PEMS) that has to be attached to the car. In reflecting to a greater extent real-world driving style, the new tests should score more accurate results that the traditional lab tests.[59]

In addressing the problem of NOx emissions from diesel vehicles, this amending regulation should contribute to the decrease of the current sustained high levels of NO2 concentrations in ambient air, which are a major concern regarding human health.[60]

4.1.3 EC Regulation 2016/427: stringency of the new tests regarding the control of emissions

The EC and the Member States have been at pains in finalising the dates of implementation and the stringency of the new tests. On 28 October 2015, the Technical Committee of Motor Vehicles (TCMV) watered down the proposal from the EC. Initially NOx readings, primarily associated with diesel cars, could exceed an 80 mg/km limit by 60 per cent before falling to 20 per cent. In order to allow manufacturers to gradually adapt to the RDE rules, the TCMV took the view that the final quantitative RDE requirements should be introduced in two subsequent steps however with laxer requirements.

- in a first step, car manufacturers will have to bring down the discrepancy to a conformity factor of maximum 2.1 (110 per cent) for new models by September 2017 (for new vehicles by September 2019);
- in a second step, this discrepancy will be brought down to a factor of 1.5 (50 per cent), taking account of technical margins of error, by January 2020 for all new models (by January 2021 for all new vehicles).

Table 24.6 above sets out these new arrangements.

The EC hammered out a deal with the TCMV in accepting its watered-down proposal. Given that the new tests had to be adopted by the EC in accordance with the regulatory procedure with scrutiny,[61] the EP was empowered under Decision 1999/468/EC to object

[59] Transport & Environment, *Realistic real-world driving emission tests: the last chance for diesel cars?* July 2015.

[60] Preamble of the 'Proposed EU Type-Approval Regulation', Recital 6.

[61] The EP and the Council have the right of scrutiny that enables them to pass a resolution if the institution believes that the proposed measure exceeds the implementing powers provided for in the basic act.

them. On 14 December 2015 in Brussels, the EP Environment Committee drafted a formal objection to the EC proposal on the account that the requirements were too lax. However, on January 2016 in Strasbourg a deeply divided plenary session could not muster the objection endorsed by its Environment Committee. On 26 April 2016, the test procedures were introduced by EC Regulation (EU) 2016/646.[62]

To assess whether the new RDE requirements amount to a breakthrough or to a hoax depends on which end of the telescope one peers through into the issue. Peering from one end, one could take the view that the allowed divergence between the regulatory limit measured in real driving conditions and measured in laboratory conditions is still a significant reduction compared to the current discrepancy (400 per cent on average). A look from the telescope from the other end, however, produces a quite different picture. In effect, thanks to a conformity factor of 2.1 from late 2017, diesel cars could emit more than twice the Euro 6 legally binding thresholds. The permitted overshoot shall fall to 50 per cent by 2020. Needless to say, the new measure is especially controversial in the wake of the VW emissions cheating scandal and is likely to dent consumer confidence even further. In addition, given the high concentrations of NOx emissions in urban areas and the flurry of infringements of Directive 2008/50/EC, urgent consideration should be given to robust RDE test with a view to ensuring a significant decrease of NOx emissions.

On 13 December 2018, the General Court ruled that the Commission had no power to amend the emission limits spelled out by Regulation No 715/2007 for the RDE tests by applying correction coefficients.[63] The Court further held that even if it had to be accepted that technical constraints may justify a certain adjustment, a difference such as that stemming from the contested regulation means that it is impossible to know whether the Euro 6 standard is complied with during those tests. Accordingly, the Court annulled point 2 of Annex II to Commission Regulation (EU) 2016/646 amending Regulation (EC) No 692/ 2008 as regards emissions.

4.2 Software Defeat Devices

The use of defeat devices has been prohibited successively by Directive 98/69/EC and by Regulation 715/2007.[64] This prohibition did not prevent several car manufacturers from using these devices. By way of illustration, VW's diesel engines were equipped both in the US and in the EU with software reducing the NOx output in order to satisfy stringent emission standards whereas cars were producing much higher emissions during normal driving conditions.

EC Regulation (EU) 2016/646 included new provisions in Regulation (EC) 692/2008 that require the disclosure of the existence of all potential defeat devices during the vehicle type-approval process. TAAs are called on to supervise the emission control strategy

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[62] Commission Regulation (EU) 2016/646 of 20 April 2016 amending Regulation (EC) No 692/2008 as regards emissions from light passenger and commercial vehicles (Euro 6) (OJ L 109, 26 April 2016, p. 1).

[63] Joined Cases T-339/16 *Ville de Paris v Commission*, T-352/16 *Ville de Bruxelles v Commission*, T- 391/16 *Ville de Madrid v Commission*, (2018) ECLI:EU:T:2018:927 (appealed).

[64] Article 5(2) of Regulation (EC) No 715/2007. Article 3 provides a definition of 'defeat device'.

applied by the manufacturer at type-approval, following the principles already applied to heavy-duty vehicles by Euro VI Regulation (EC) No 595/2009 and its implementing measures. On the other hand, the EC has invited Member States to investigate the presence of defeat devices in the vehicles circulating on their territories and to report back. The EC also published a guidance document[65] to help Member States evaluate if car manufacturers use defeat devices or other strategies that lead to higher vehicle emissions outside of the test cycle and analyse whether they are technically justified.

Lastly, the 2018 'EU Type-Approval Regulation' that shall enter into force in 2020 maintains this definition of defeat devices, but tightens the screws further. At the request of the approval authority and technical services, manufacturers are obligated to provide them with access to 'the software and algorithms of the vehicle that they consider to be necessary for the purpose of carrying out their activities'.[66]

5. PENALTIES

Article 197 TFEU requires an 'effective implementation of Union law by the Member States'. Therefore, penalties play a key role in avoiding frauds that undermine the regulatory framework established at EU level. By virtue of Article 13 of Regulation 715/2007, Member States are called on to lay down the provisions on penalties applicable for infringement by manufacturers of the provisions of this Regulation and to take all measures necessary to ensure that they are implemented. The types of infringement which are subject to a penalty include falsifying test results for type approval.[67] By the same token, the 2018 'EU Type-Approval Regulation' obliges the Member States to lay down penalties for infringements by economic operators falsifying the results for type-approval.[68]

However, the regime of penalties is embroiled with controversies. Given that the penalties have not been harmonised,[69] Member States are empowered to choose the penalties that seem to them to be appropriate. Given a shortage of data, it is difficult to assess the impact of the existing national penalties. It is worthy of note that a number of Member States have not set up appropriate sanctions for infringement of the relevant legislative provisions.[70] In contrast to US federal law,[71] the national sanctions for marketing a car which does not conform with a type-approved car appear to be ineffective.[72]

What is more, in order to assess whether the penalty in question is consistent with the principle of proportionality, account must be taken of different factors (the economic benefits for the wrongdoer, previous convictions, etc.). In particular, the national courts

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[65] Guidance on the evaluation of Auxiliary Emission Strategies and the presence of Defeat Devices with regard to the application of Regulation (EC) No 715/2007 on type approval of motor vehicles with respect to emissions from light passenger and commercial vehicles (Euro 5 and Euro 6).

[66] Article 25(4).

[67] Article 13(2)(b).

[68] Article 89(2)(b).

[69] The penalties provided for must be 'effective, proportionate and dissuasive'.

[70] EMIS consideration on the approval and market surveillance of mother vehicles and their trailers, 21 October 2016.

[71] §7522(a) (1) Clean Air Act.

[72] Krämer (2016), o.c., 71.

will have to pay heed to the nature and the degree of seriousness of the infringement which the penalty seeks to sanction and of the means of establishing the amount of the penalty.[73]

However, the empowerment of the EC to issue fines of up to €30,000 per vehicle in case of non-compliant vehicles on the EU market (e.g. defeat devices or fake declarations) brings a breath of fresh air.[74]

6. CONCLUSIONS

Given the discussion in the previous sections, several regulatory issues arise for comment here.

The core issue is whether EU environmental regulations on cars resemble more an approach accompanying the growth of the car industry and enhancing the automotive society, rather than a move to call the environmental legacy of car transportation in question. As a matter of fact, all noise, pollution, nuisances, or attacks on the natural environment cannot be prohibited because were this to be done, life within society would become impossible. The only viable solution therefore involves authorising polluting activities and requiring compliance with thresholds (emission standards, air quality standards, product standards) over which the environmental harm is considered to be unacceptable. Therefore, since a certain level of environmental pollution can be sustained without significant environmental harm, certain limits have been set by the EU institutions on the technical characteristics of cars and fuels and the ability of the ecosystems and human beings to withstand their environmental impacts. In fact, the aim of the EU environmental law model is not to eliminate pollution, but rather to contain its most serious consequences. Yet the picture is not as idyllic as one might think.

The following paradox lies at the heart of the EU clean air policy. Although the type-approval emission requirements for motor vehicles have been gradually and significantly tightened through the introduction and subsequent revision of Euro standards, ambient air quality in a number of cities has not really improved. In particular, emissions of NOx from road transport have not sufficiently decreased to meet air quality standards in many urban areas.[75] Accordingly, air quality standards and economic imperatives appear to clash.

The success of a clean air policy relies upon a genuine coordination of regulations on fuel efficiency, tailpipe emissions, engine performance, and fuel content. EU law is falling short of meeting that objective. In effect, EU secondary law does not articulate air emissions and air quality standards; nor does it ban old cars from city centres. These tasks are left to the national authorities. As a result, the car emissions rules do not implement the principle of fighting environmental harm at source enshrined in Article 191(2) TFEU.[76]

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[73] See, inter alia, C-259/12 *Rodopi-M 91* [2013] EU:C:2013:414, para. 38; Case C-487/14*, SC Total Waste Recycling SRL* [2015] C:2015:780, para. 53.

[74] The system of administrative fines and their calculation needs to be specified by a Commission delegated act: Article 85(2) of the Regulation 2018/858 on cars type-approval.

[75] EEA, *Air Quality in Europe – 2018 Report*, o.c., 9.

[76] L. Krämer, 'The Principle of Fighting Environmental Harm at Source' in L. Krämer and E. Orlando (eds) *Elgar Encyclopedia of Environmental Law. Principles of Environmental Law* (Cheltenham: Edward Elgar, 2018) 193.

In order to understand the subject matter, one has to juggle with numerous directives and regulations spewing out excessive detailed technical measures, measurements, controls which are constantly modified. Given the absence of consolidating texts, one is struck by the lack of transparency[77] and the shortage of interactions between these different regulations.

By the same token, harmonisation of penalties would be needed to achieve better enforcement. Last, poor environmental results can be explained by the absence of harmonisation of eco-taxes. A 2005 proposal from the EC to fix the tax for individual cars according to their CO_2 emissions was withdrawn in 2015.[78] As a result, Member States have significant freedom to adopt their environmental tax policies with a view to encouraging the best environmental standards.[79] In order to remove cars not complying with Euro 5 standards, cities impose either congestion charge or merely ban them, however without recourse to tax schemes.

What is more, given the sheer increase in the number of cars placed on the market and the distances covered by car drivers, the EU standards should be technology-forcing. However, account must be taken of the fact that so far the EU standards have not succeeded in forcing the manufacturers and the importers to produce alternatively powered vehicles that release fewer pollutants. In fact, the vast majority of Europe's new cars remain powered by gasoline or diesel motors.[80] Despite an increase over the last years, passenger cars powered by alternative fuels, including hybrid cars, only made up a small share of the fleet of passenger cars in the EU in 2018.

Finally, it is necessary to face hard facts: the main weakness of EU rules is, as recognised by the EC, their lack of efficacy, with directives and regulations appearing as paper tigers. As a matter of principle, the EC, as Guardian of the Treaties, should pursue these infringements relentlessly. Here too there are numerous pitfalls. Firstly, given the decentralised nature of the EU, compliance with EU emission standards depends on at least 28 different legal and administrative systems underpinned by different cultural factors. Secondly, the EC is not sufficiently well informed. Since it does not have any general powers of inspection, nor a body of inspectors, the control exercised by this institution over the national authorities is based largely on the reports transmitted by the Member States. Thirdly, the EU institutions do not appear to be really willing to take bold steps in improving the enforcement. The EC has been criticised for this inaction in the aftermath of the VW scandal. The EP has been unwilling to object the amending regulation on RDE.

With hindsight, it appears that the EU approach to air pollution caused by light cars has turned out to be little more than a sticking plaster on a weeping sore.

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[77] Krämer (2016), o.c. 317.

[78] Ibdid., p. 309.

[79] Taxation of more polluting second-hand vehicles compatible with Euro standards has been giving rise to litigation. See de Sadeleer (2014) o.c. 237–59. Regarding the compatibility of a pollution tax levied on first registration of second-hand vehicles compatible with Euro 3 and Euro 4 air pollution standards is consistent with Article 110 TFEU, see Case C-254/13 *Orgacom* [2014] C:2014:2251. Whether a Rumanian environmental tax levied on first registration of motor of second-hand vehicle compatible with Euro 2 air pollution standards is discriminatory, see Case C-263/10 *Iulian Nisipeanu* [2011] C:2011:466.

[80] ICTT, *European Vehicle Market Statistics 2013,* 6.